

The City of Newport Beach

NOISE

Element

Noise Element
of the
City of Newport Beach
General Plan

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Adopted by the City Council
October 15, 1974
Resolution No. 8366

Amended by GPA 87-1(B)
October 10, 1994
Resolution No. 94-96

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APPENDIX

A1. TECHNICAL APPENDIX (Separate Cover)

NEWPORT BEACH GENERAL PLAN

NOISE ELEMENT

The Noise Element of a General Plan is a comprehensive program for including noise control in the planning process. It is a tool for local planners to use to achieve and maintain compatible land use with environmental noise levels. The Noise Element identifies noise sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to insure that Newport Beach residents will be protected from excessive noise intrusion.

The Noise Element follows the revised State guidelines in the State Government Code Section 65302(f) and Section 46050.1 of the Health and Safety Code (described in more detail in the Technical Appendix). The element quantifies the community noise environment in terms of noise exposure contours for both near and long-term levels of growth and traffic activity. The information contained in this document provides the framework to achieve compatible land uses and provide baseline levels and noise source identification for local noise ordinance enforcement.

The Element is divided into seven sections and an Appendix. Included in the Element is a glossary that defines a number of key terms used in noise assessments. The Noise Element is organized as follows:

1. **INTRODUCTION** - presents the noise issues in the City that are to be addressed within the Noise Element.
2. **GOAL STATEMENT** - defines the goals of the Noise Element.
3. **INVENTORY OF CURRENT AND FORECAST CONDITIONS** - describes the existing and future noise levels in the City.

4. **POLICIES AND IMPLEMENTATION** - defines and summarizes the policies and programs to be implemented by the City to achieve the goals of the Element.
5. **ANALYSIS** - section describes the noise environment, effects of noise and describes techniques to minimize noise and land use conflicts.
6. **GLOSSARY** - defines noise terminology used in the Element.
7. **TECHNICAL APPENDIX** - contains background information including methodology, measurement and modeling results, and bibliography.

1.0 INTRODUCTION

Within the City of Newport Beach are a number of transportation related noise sources including freeways and major and minor arterials. The existing freeway includes the Corona Del Mar Freeway (State Route 73). In the future, the San Joaquin Hills Transportation Corridor (SJHTC) will connect with State Route 73 and will be within the city boundary. John Wayne Airport lies just north of the northern boundary of the City of Newport Beach with aircraft operations over the City of Newport Beach. Charter and tour boat and recreational boat activity in Newport Harbor are other transportation noise sources within the City. There are also stationary (or non-transportation related) noise sources within the City of Newport Beach which include restaurant/bar/entertainment establishments, mechanical equipment, residential party noise, residential recreational facilities including basketball courts and skateboard ramps and barking dogs. These are some of the contributors of noise in Newport Beach. Effective strategies to reduce their influence on the community noise environment are an essential part of the Noise Element.

Information relative to the existing and forecast noise environment within Newport Beach should be integrated into future land use planning decisions. The Element presents the noise environment in order that the City may include noise impact considerations in development programs.

Residential land uses and areas identified as noise sensitive should be protected from excessive noise from transportation and non-transportation noise sources. The impacts of non-transportation noises are most effectively controlled through the enforcement and application of City stationary source noise Ordinances or Regulations.

2.0 GOAL STATEMENT

Environmental noise is a major concern of the citizens of Newport Beach. In this Noise Element of the General Plan, the policies and implementation programs for controlling noise within the City boundaries are established. The policies and programs established in this element derive from the goals set for noise control within the City.

The goals of the City in adopting the Noise Element of the General Plan are as follows:

1. Provide sufficient information concerning the community noise environment by presenting current and forecast noise levels so that noise can be objectively considered in land use planning decisions in the City of Newport Beach. This inventory of the noise environment within the City will identify the different types of noise sources, noise sensitive receptors, and some unique noise issues that face the City of Newport Beach.
2. Provide policies and implementation measures that will protect and maintain those areas of the city that have acceptable noise environments. This includes protecting those areas from both transportation related noise as well stationary noise sources.
3. Provide programs that will reduce the noise levels in existing noise sensitive areas where the noise environment has already reached unacceptable levels by developing, where feasible, programs to reduce the noise levels in these areas and ensuring that new development in these areas is compatible with surrounding noise levels.

4. To establish a comprehensive program and minimize the impact of noise generated by aircraft departing JWA and the maintain the quality of life for Newport Beach residents by preserving the operational restrictions at JWA, investigating ways to extend or strengthen those restrictions, and encouraging the development of a second commercial airport in Orange County.

3.0 INVENTORY OF CURRENT AND FORECAST CONDITIONS

This section contains a description of the current and projected noise environment within the City. This description of the noise environment is based on an identification of noise sources and noise sensitive land uses, a community noise measurement survey and noise contour maps.

To define the noise exposure, this section of the report first identifies the major sources of noise in the community. Some of the major sources of transportation related noise in and around Newport Beach include, but are not limited to, a major freeway, major arterial roadways, John Wayne Airport, and occasional helicopter overflights from Tustin Marine Corp Air Station (MCAS). In addition to transportation related noise sources, there are also stationary noise sources and some of these sources include, but are not limited to, residential and boat parties, residential recreational facilities, restaurants, barking dogs, mechanical equipment such as air conditioning units, and commercial centers. To completely assess the noise environment in the City, noise sensitive receptors must also be identified. As mandated by the state, noise sensitive receptors include, but are not limited to, areas containing schools, hospitals, rest homes, long-term medical or mental care facilities, residential areas, or any other land use areas deemed noise sensitive by the local jurisdiction.

3.1 Sources of Noise

Noise sources in The City of Newport Beach can be divided into two basic categories, transportation and non-transportation sources. In this summary of the noise exposure, the transportation sources are further reduced to four sub-categories: freeways, major and minor arterial roadways, aircraft, and water vehicle sources. Stationary sources and each of these transportation sources and their impacts on the noise environment of Newport Beach are summarized in the following paragraphs.

3.1.1 Transportation Noise Sources

The most common sources of noise in urban areas are transportation related noise sources. These include automobiles, trucks, motorcycles and aircraft. Motor vehicle noise is of concern because it is characterized by a high number of individual events which often create a sustained noise level and by its proximity to areas sensitive to noise exposure.

Freeways - The City of Newport Beach has one freeway within its borders, State Route 73, and one freeway that will be within its border in the future, the San Joaquin Hills Transportation Corridor (SJHTC). The Corona Del Mar Freeway (SR-73) runs in a northwest/southeast direction through the City's northern section. The portion of State Route 73 that cuts through the northern portion of the city is below grade from the adjacent land uses. There are a few residences in close proximity to this freeway. None of the homes that are located directly adjacent to the freeway are exposed to noise levels in excess of 65 CNEL. Note that noise levels from this freeway are likely to increase in the future due to increased traffic along the freeway.

The future SJHTC (San Joaquin Hills Transportation Corridor) will run in a northwest/southeast direction through the City's northeastern boundary connecting with the State Route 73 at Jamboree Road. At various locations, the freeway will be at grade with or elevated above the adjacent land uses. There are a few existing residences that will be in close proximity to this freeway when the freeway is built, but these residences have already included noise mitigation measures to sufficiently attenuate the noise from the San Joaquin Hills Transportation Corridor. Therefore, none of these homes that will be located directly adjacent to the freeway will be exposed to noise levels in excess of 65 CNEL.

Aircraft Operations - Many residents of Newport Beach are impacted by noise generated by commercial and general aviation aircraft departing John Wayne Airport.

Newport Beach is located immediately south of John Wayne Airport and is under the primary departure corridor. The County of Orange is the operator of John Wayne Airport. The air traffic is made up of commercial air carriers, commuter turbo-prop aircraft, business jets, and single and twin engine general aviation aircraft. There is also aircraft traffic from the Tustin Marine Corp Air Station (MCAS) that overfly the Newport Beach area. However, the MCAS will be closing and the aircraft overflight out of this air station will cease at the time of closure. The City has a long history of disputes with the County regarding aircraft noise from John Wayne Airport. In 1985 the City, County, and two Newport Beach homeowner associations entered into the John Wayne Airport Settlement Agreement. This Settlement Agreement expires in 2005. The Settlement Agreement establishes three types of aircraft based upon noise generating characteristics and establish limits on aircraft utilizing the airport.

Major and Minor Arterial Roadways - Traffic noise on surface streets is a significant source of noise within the community. The major roadways in the city, currently or in the future, include: Bluff Road, Placentia Avenue, Newport Boulevard, Superior Avenue, Balboa Boulevard, 22nd Street, Dover Drive, 15th Street, Campus Drive, Irvine Boulevard, Mesa Drive, Birch Street, Bristol Street, North Bristol Street, Jamboree Road, Bayside Drive, MacArthur Boulevard, Von Karman Avenue, University Drive North, University Drive, Bison Avenue, Eastbluff Drive, Ford Road, San Joaquin Hills Road, Newport Center Drive, Santa Barbara Drive, Santa Cruz Drive, Avocado Avenue, San Miguel Drive, Spyglass Hill Road, Marguerite Avenue, and Pacific Coast Highway.

Noise levels along roadways are determined by a number of traffic characteristics. Most important is the average daily traffic (ADT). Additional factors include the percentage of trucks, vehicle speed, the time distribution of this traffic and gradient of the roadway.

In general, most of the land uses along the arterial roadways is commercial and industrial. However, there are a number of single-family homes that are located adjacent to arterials.

Boats - The City of Newport has the largest small boat harbor in Southern California, bordered by thousands of residents. Ten thousand boats operate near noise-sensitive residential uses that border much of Newport Bay. Noise associated with these boats may be a problem to these residences. Of particular concern are the charter boats which generate engine noise, use loudspeakers, and generate noise from the occupants of the charter.

3.1.2 Non-Transportation Noise Sources (Stationary Noise Sources)

There are many stationary noise sources within the boundaries of the City of Newport Beach. Some of these stationary noise sources include, but are not limited to, restaurant/bar/entertainment establishments, mechanical equipment, residential party noise, residential recreational facilities including basketball courts and skateboard ramps, and barking dogs. Some of these noise sources will be discussed in greater detail below.

Restaurant/Bar/Entertainment Establishments - Numerous restaurants and bars and entertainment establishments on PCH, the Peninsula, and Balboa Island have been subject to noise complaints in the past. There are many of these types of establishments near or adjacent to residential areas. This close proximity to noise sensitive areas, the potentially high noise levels that these establishments are able to produce, and the late hours of operation are some reasons for the number of noise complaints that have been made in the past.

Mixed Use (Commercial/Residential) - The section above discusses the problems of noise from restaurant/bar/entertainment establishments affecting nearby residences where as this section discusses the unique problems associated with mixed use areas. In a mixed use building, a portion of it may be used as commercial (i.e. office space,

restaurant, market, dry cleaner, etc.) and the remaining portion may be used as residential. This juxtaposition of two distinctly different land use types presents a disparity in the appropriate noise standards to be applied. Such mixed uses can range from a small retail structure with a residence unit on the second floor (as seen on parts of Balboa Island and the Balboa Peninsula) to larger commercial properties that include a residential component. On the one hand, requiring that the commercial portion conform to the more strict residential noise standards would make operating the commercial facility difficult. On the other hand, applying the commercial noise standards to the entire project would make the noise exposure levels at the residential portion of the building potentially too high. Mixed use projects represent a unique and difficult noise environment in terms of land use planning policy. There are advantages to mixed use areas. Therefore, it is important that a program be developed that allows mixed use developments to operate with a minimum amount of conflict.

Mechanical Equipment Noise - Various Heating Ventilating and Air Conditioning (HVAC) installations and occasional pool and spa pumps can be noise intrusions. This is a problem especially in areas like Balboa Island, Lido Island, and the peninsula where the homes are very close together. With the lack of side yard space available between homes, there are very few options for the placement of the air conditioning units to obtain maximum separation from neighboring homes. Noise barriers or enclosures are very difficult to design for air conditioners because air conditioning units require large clearances around the unit for proper ventilation. These clearance requirements result in very large enclosures or ineffective noise reduction. The use of air conditioners poses a significant conflict between the desire to achieve low noise levels and the ability of residents to own and operate air conditioners. In areas of the City with small side yard areas this conflict may not have an easy resolution. Note that pool and spa equipment is somewhat easier to mitigate because the required clearances for ventilation are smaller and barriers and enclosures can be more effective. There has also been some concern over the noise created by pulse heaters. These heaters, as their name suggest, operate with pulses of air passing through the unit and can generate noise characterized by a

rhythmic pulse. This type of noise can become very disturbing. There have also been noise problems from the Hoag Hospital physical plant. This mechanical equipment is large since it must service a large facility; therefore the noise levels can become loud. There are condominiums adjacent to the Hoag Hospital that are exposed to the noise generated by the physical plant.

Residential Party Noise - Residential party noise, particularly on Balboa Island, the Balboa Peninsula, and in the West Newport Area Balboa Peninsula has been an ongoing problem. The West Newport area, for example, has a high percentage of short term rental units which, combined with the close proximity of the housing units, has been the cause of many complaints within the City of Newport Beach. There are difficulties in trying to control party noise. If a noise limit is established for enforcement using a quantitative measure, the code enforcer, either a staff member from the City of Newport Beach Planning Department or from the Police Department, would be required to make noise measurements of the intrusive noise. Often, the disturbing levels of noise that were generated by a party is reduced once a code enforcer arrives on the premises to make measurements. Therefore, party noise level measurements may be an impractical means of party noise enforcement since it is often not possible to accurately capture the loud noise levels being generated by the party. Historically, police officers use their judgment for identifying and controlling party noise problems.

Boat Party Noise - In addition to residential party noise, boat parties which take place on the boat while it is docked can be a source of noise. Since most of the socializing on private boats takes place on deck (i.e. outdoors), there is little or no means of attenuation from the party noise as many of the boats are in private marinas or docked in front of residences. However, charter boats, generally larger in size and carrying large numbers of paid passengers need to control on-deck noise by means of eliminating outside loudspeakers.

Recreational Activities - Another source of stationary noise in the City of Newport Beach is noise from recreational activities such as league and youth sporting games. These are sometimes scheduled during early morning hours on the weekends and can be a source of noise intrusion on nearby residences. The typical type of noise generated include people shouting and whistles/horns blowing. Some sporting events may also utilize PA systems.

Barking Dogs - There are many dogs within the City of Newport Beach boundaries. Dog barks can be characterized as being impulsive and startling or continuous and sustained. In either event, it can be a major source of noise disturbance. Most people keep their dogs outdoors which makes it very difficult to attenuate the noise due to these barking dogs.

3.2 Noise Sensitive Receptors

The City of Newport Beach has a number of public and private educational facilities, hospitals, convalescent homes and other facilities that are considered noise sensitive. However, the primary noise sensitive use within the City is residential use. The distribution of these sensitive uses varies from quiet residential areas to loud residential such as those areas adjacent to the freeway.

3.3 Community Noise Measurement Survey

Based upon the identification of the major noise sources and the location of sensitive receptors, a noise measurement survey was conducted. The function of the survey was threefold. The first function was to determine the existing noise levels at noise sensitive land uses. The second function was to provide empirical data for the correlation and validation of the computer modeled noise environment. A third important aspect of the survey was to obtain an accurate description of the ambient noise levels in various communities throughout the City. The Technical Appendix to this Element provides a

complete description of a series of comprehensive noise measurements made throughout the City of Newport Beach.

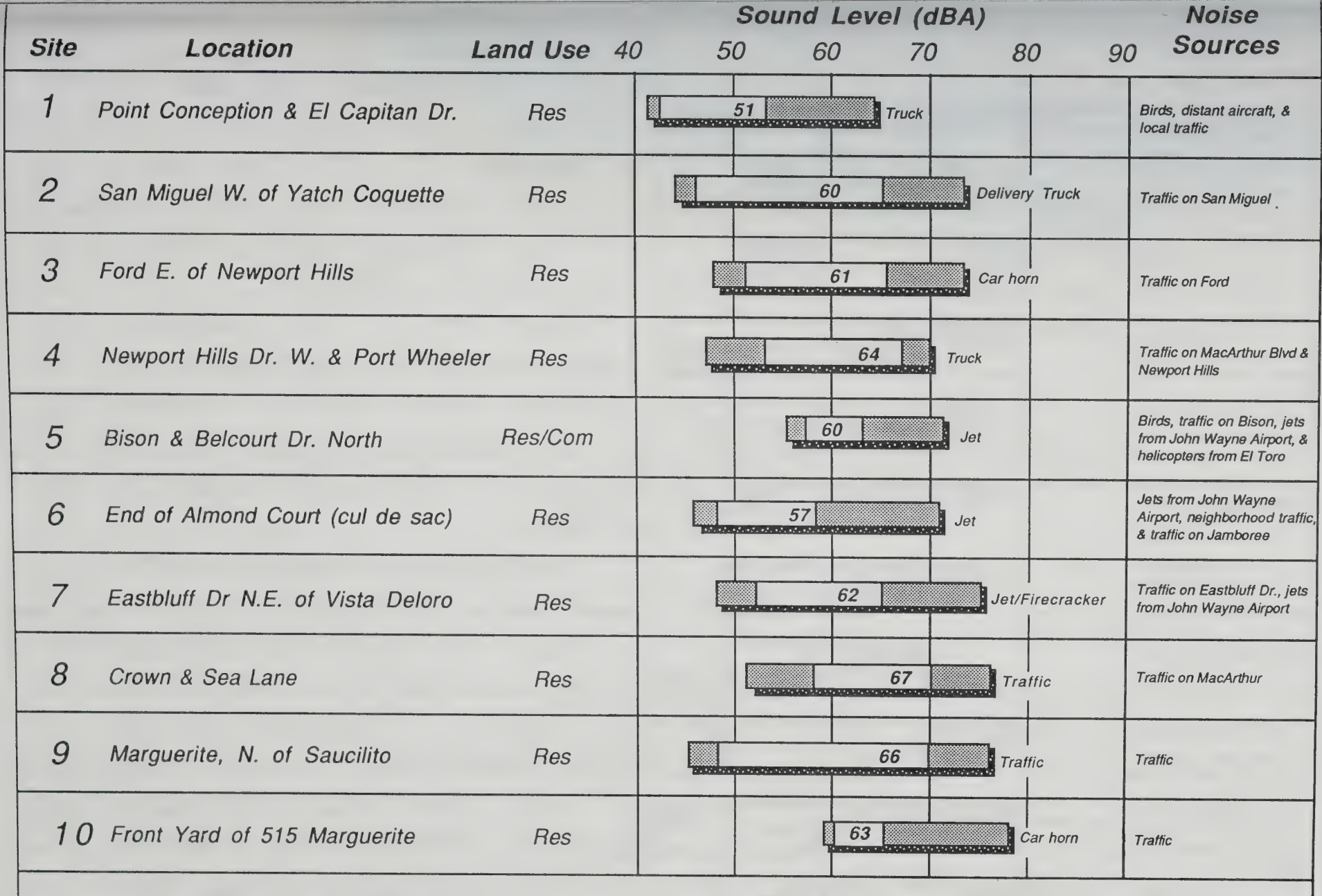
3.4 Measurement Procedure

Thirty eight sites were selected for measurement of the noise environment in Newport Beach. A review of noise complaints and identification of major noise sources in the community provided the initial base for development of the community noise survey. The measurement locations were selected on the basis of proximity to major noise sources and noise sensitivity of the land use. The measurement locations are shown in Figure 1. Noise measurements at five of the sites (sites 24 & 28-31) along the beach were repeated once during a summer weekday and once again during a summer weekend.

The Newport Beach Noise Element measurement survey utilized the Brüel & Kjaer 2231 automated digital noise data acquisition system for short-term (15 minutes) LEQ readings. This instrument automatically calculates both the Equivalent Noise Level (LEQ) and Percent Noise Level (L%) for any specific time period. The noise monitor was equipped with a Brüel & Kjaer Type 4155 1/2 inch electret microphone and was calibrated with a Brüel & Kjaer Type 4230 calibrator with calibrations traceable to the National Bureau of Standards. Calibration for the calibrators are certified through the duration of the measurements by Brüel & Kjaer. This measurement system satisfies the ANSI (American National Standards Institute) Standards 1.4 for Type 1 precision noise measurement instrumentation.

3.5 Measurement Results

The first session of the noise measurement program was conducted on four separate days. The survey was taken on April 9, 17, 24, and May 7, 1991, at thirty eight locations throughout the City. As mentioned earlier, measurements at five of the sites (measurement sites 24, 28, 29, 30, and 31) were repeated twice during the summer: once during a typical summer weekday (August 28, 1991) and once again during a typical summer weekend (August 31, 1991). The results of the ambient short-term noise measurements at each site are depicted in Figure 2 (Parts 1-6). These figures also depict the primary noise source affecting the noise environment. The quantities measured were the Equivalent Noise Level (Leq), the maximum noise level (Lmax) and the Percent Noise Levels (L%). Detailed listings of the measurements are summarized in the Technical Appendix.



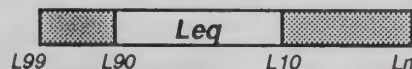
Legend: **Leg** Cause Of Lmax
L99 L90 L10 Lmax

FIGURE 2-1

Graphic Summary of Ambient Measurement Results

Site	Location	Land Use	Sound Level (dBA)						Noise Sources	
			40	50	60	70	80	90		
11	Off PCH, across St. from 326 Seaward	Res								
										</

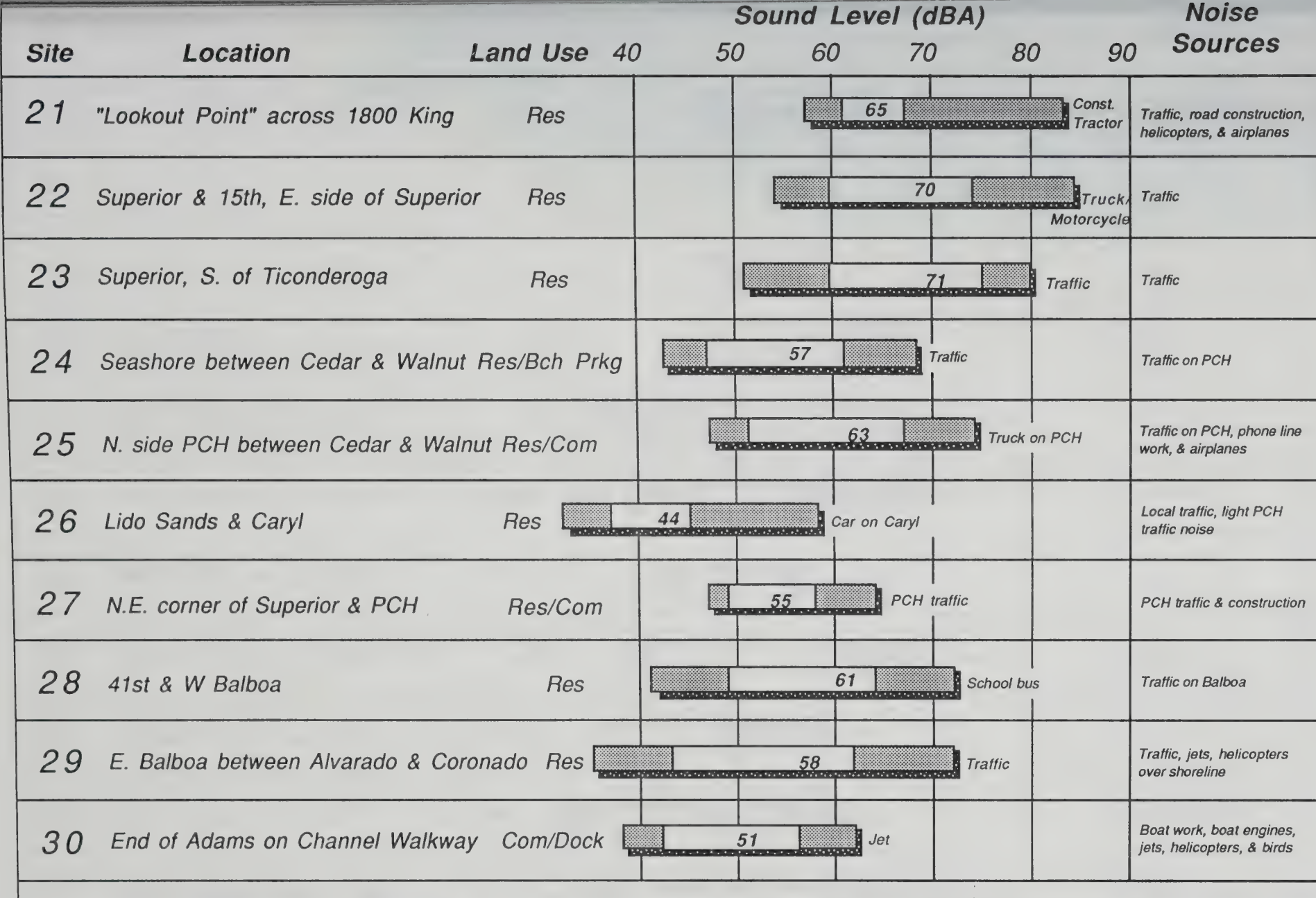
Legend:



Cause Of Lmax

FIGURE 2-2

Graphic Summary of Ambient Measurement Results



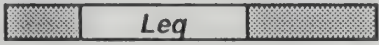
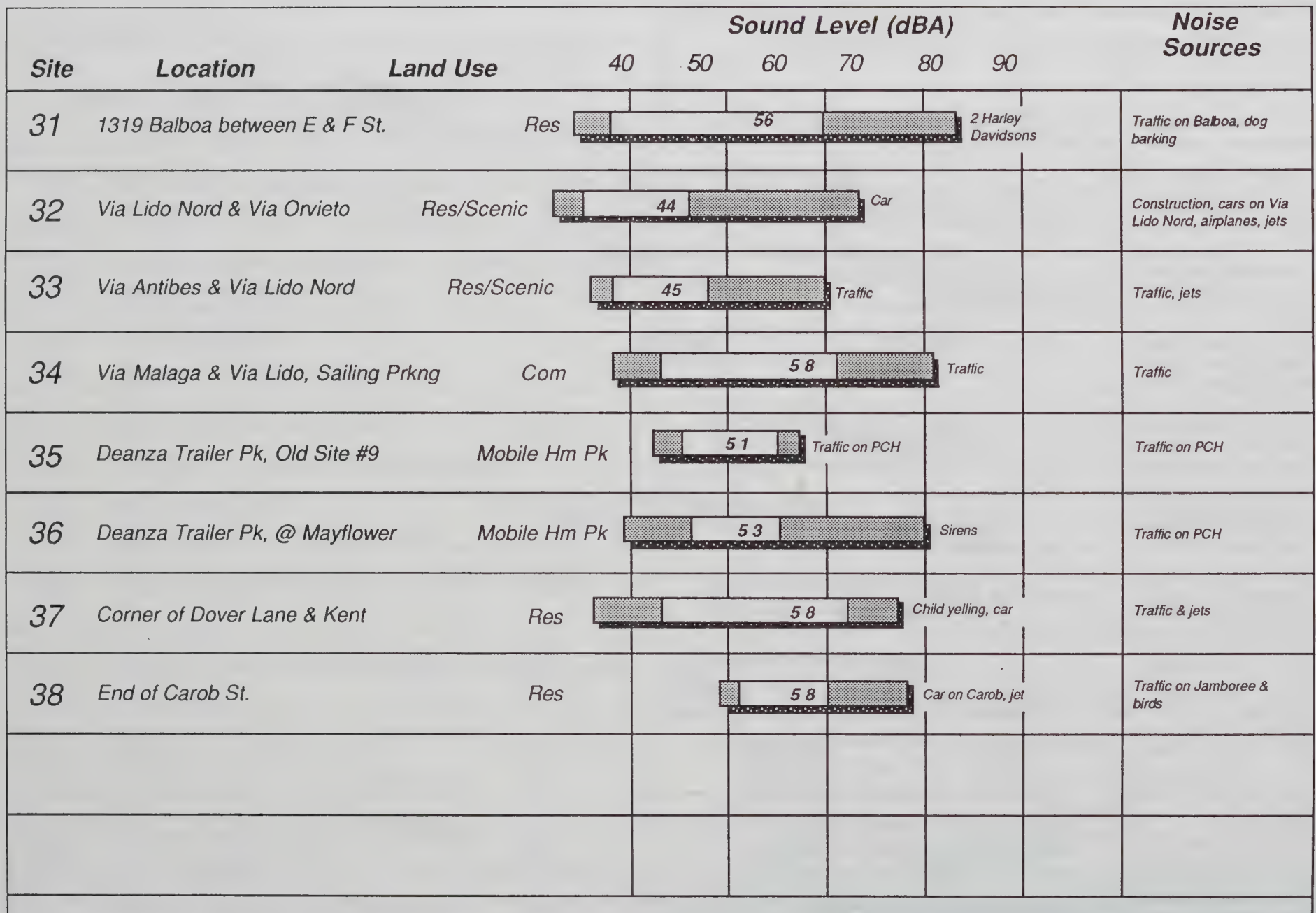
Legend:  Cause Of Lmax
L99 L90 L10 Lmax

FIGURE 2-3

Graphic Summary of Ambient Measurement Results



Legend:

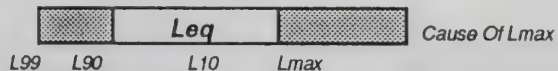
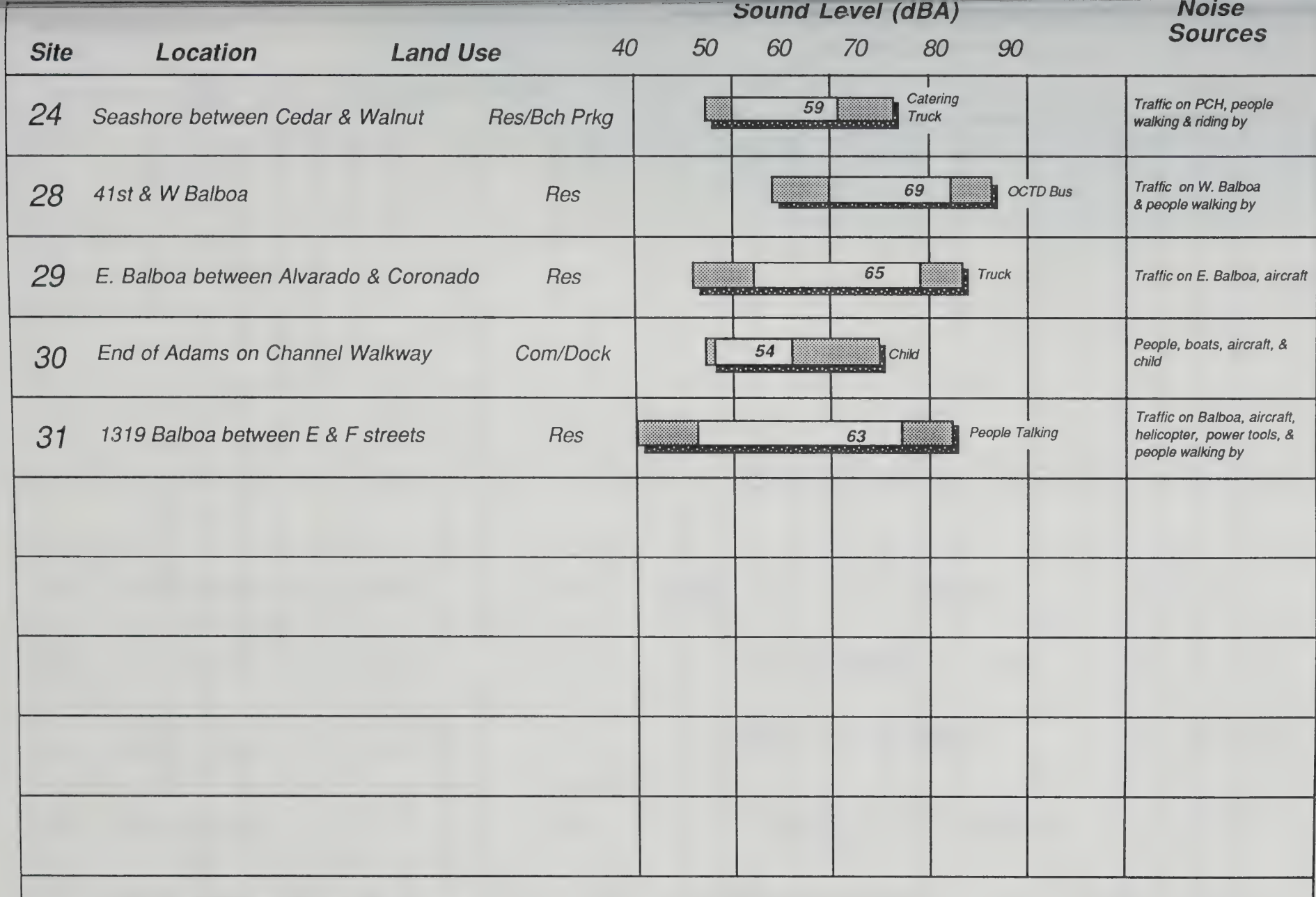


FIGURE 2-4

Graphic Summary of Ambient Measurement Results



Legend:

L99	L90	L10	Lmax
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Cause Of Lmax

FIGURE 2-5
Ambient Measurement Results (Summer-Weekday)

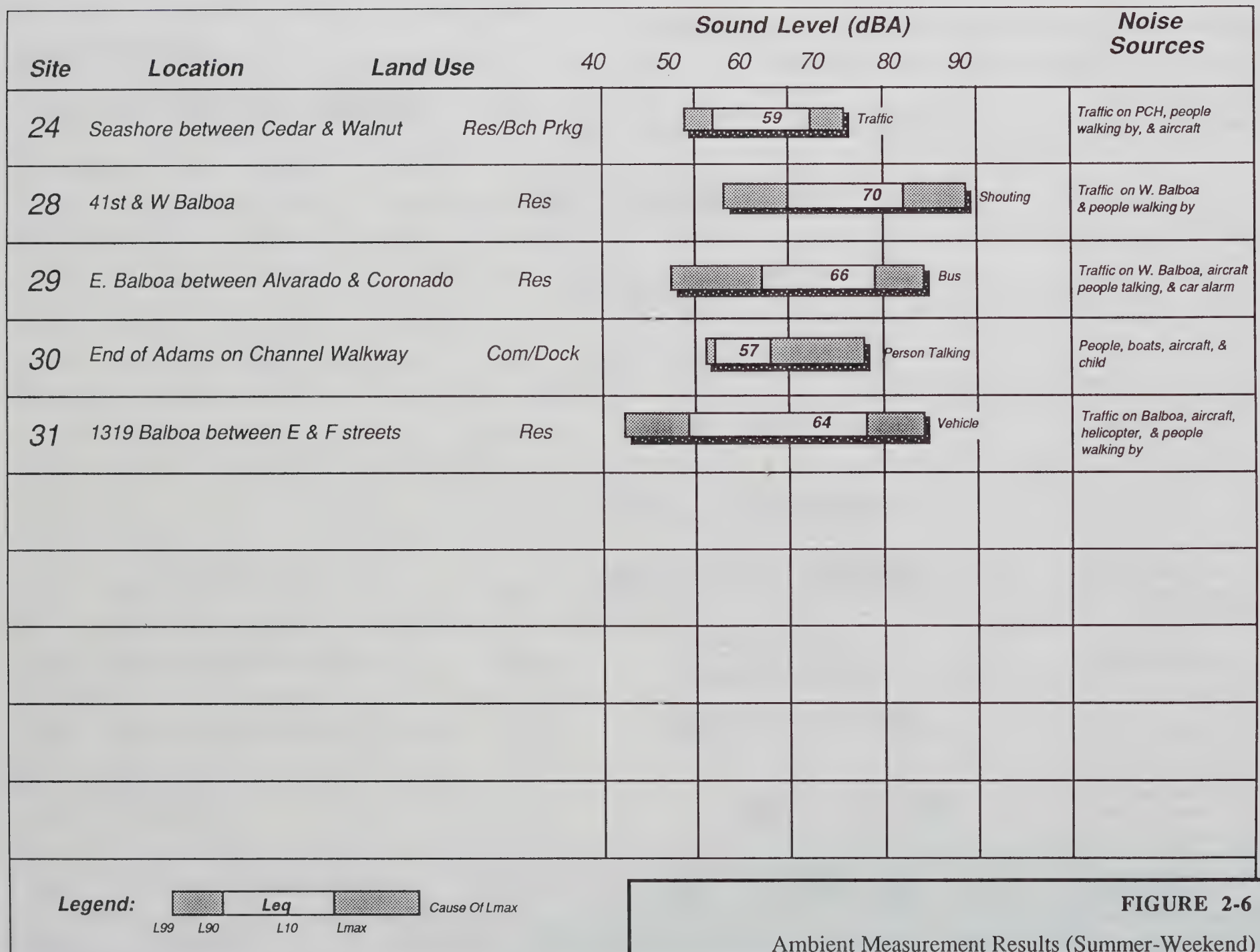


FIGURE 2-6
 Ambient Measurement Results (Summer-Weekend)

3.6 Community Noise Contours

Noise contours for all of the major transportation noise sources in Newport Beach were developed for existing conditions and future conditions. These contours were determined from the traffic levels for these sources. The contours are expressed in terms of the Community Noise Equivalent Level (CNEL). The existing conditions scenario was derived from 1991 traffic levels. Future conditions are presented for the 20 year time period of Post 2010 and are based on complete build-out of the General Plan.

The traffic noise levels projected in the Noise Element were computed using the Highway Noise Model published by the Federal Highway Administration ("FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108, December 1978). The FHWA Model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute the LEQ noise level. A computer code has been written which computes equivalent noise levels for each of the time periods used in CNEL. Weighting these noise levels and summing them results in the CNEL for the traffic projections used. The traffic data used to project these noise levels are derived from the current update to the Circulation Element for the City. The traffic mix data for the arterials are based on measurements for roadways in Southern California and are considered typical for arterials in this area.

The existing roadway noise contours are shown in Figure 3. These contours are based on existing traffic volumes that were obtained from the City of Newport Beach Traffic Engineering Division. The existing traffic volumes are the winter, 1991 traffic counts. There are some roadway links in the City of Newport Beach for which traffic counts were not made during winter, 1991. For these roadway links, the summer and fall, 1986, and summer, 1988 traffic counts were used to supplement the winter, 1991 traffic counts. The future traffic noise contours are shown in Figure 4. These contours are based on future year 2010 projected traffic volumes generated by Austin-Foust Associates in October, 1991 and represent full build out of the General Plan.

The Calendar Year 1992 Report (January through December, 1992) for the John Wayne Airport was published by the County of Orange. In addition the County prepared EIR 546 addressing the change in the Phase II Access Plan Noise Limits to accommodate the



FIGURE 3

Existing Year 1991 Roadway CNEL Noise Contours



CHBBOY CNBWTR ROW TAT2 ROW

1/4" = 100'

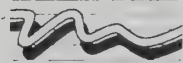
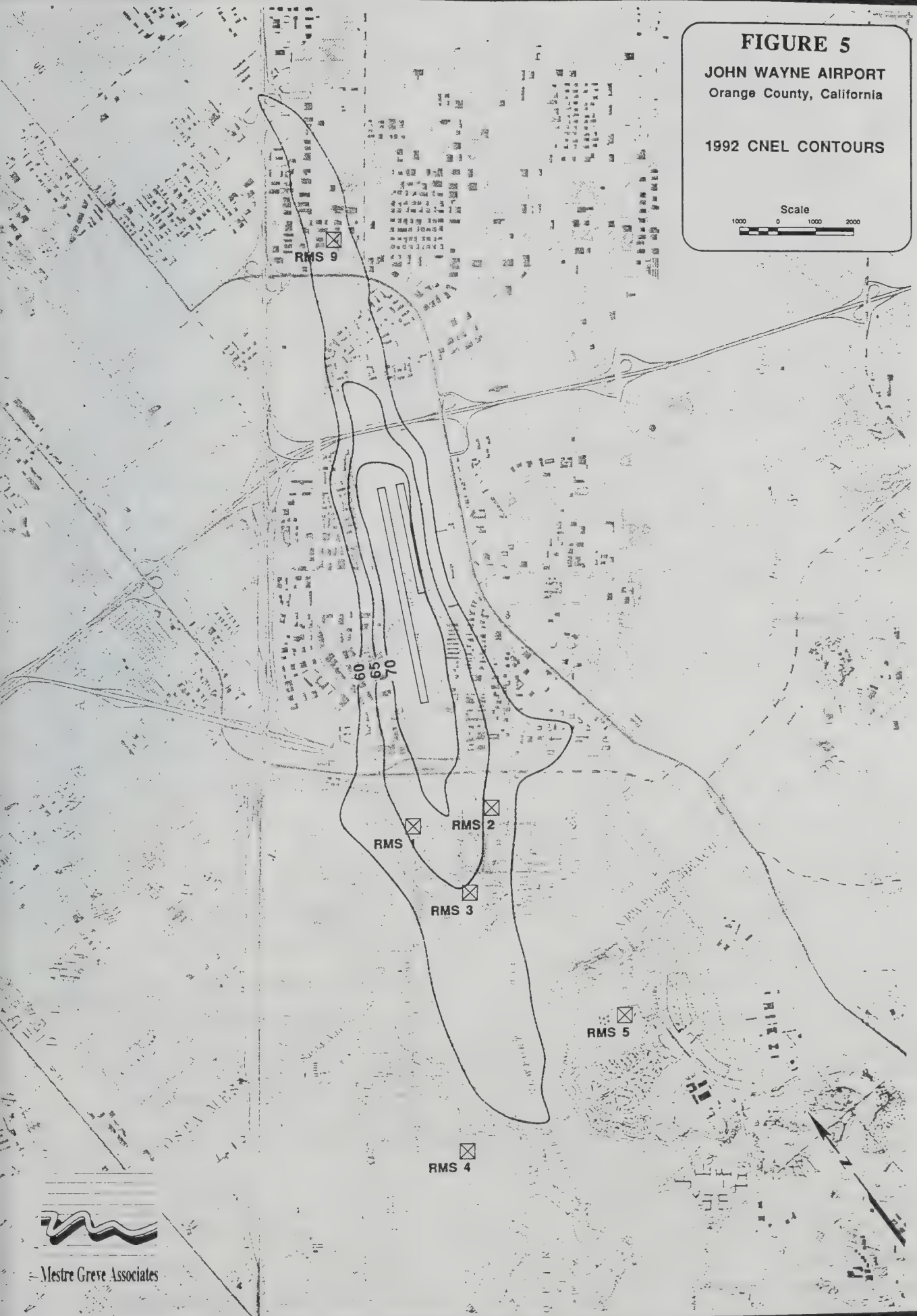
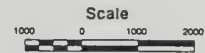
FIGURE 4

Future Year 2010 Roadway CNEL Noise Contours

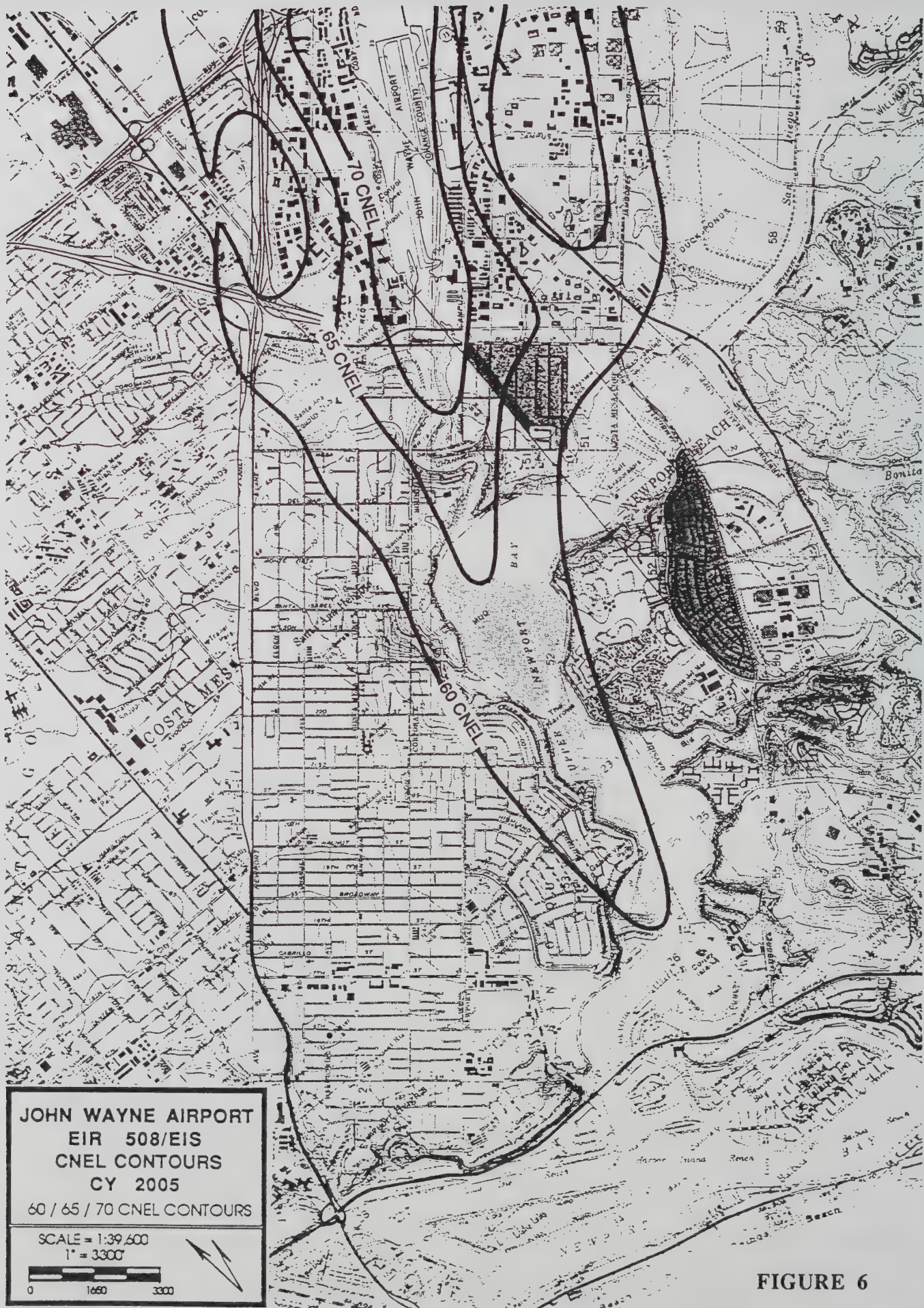
FIGURE 5

JOHN WAYNE AIRPORT
Orange County, California

1992 CNEL CONTOURS



Mestre Greve Associates



JOHN WAYNE AIRPORT
EIR 508/EIS
CNEL CONTOURS
CY 2005
60 / 65 / 70 CNEL CONTOURS

SCALE = 1:39,600
1" = 3300'

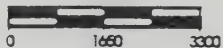


FIGURE 6

FAA required change in departure procedures. Noise contours for the John Wayne Airport for calendar year 1992 are shown in Figure 5. The noise contours shown were generated using a computer noise model and calibrated to match measured noise levels at the permanent noise monitoring sites operated by the airport. Figure 6 shows the noise contours from EIR 508 (for 1985 Master Plan for John Wayne Airport) which represents the planning contours used by the County of Orange and Airport Land Use Commission and represents realization of the full 8.4 million annual passengers permitted by the Access Plan in accordance with the 1985 Settlement Agreement between the County of Orange, the City of Newport Beach, The Airport Working Group, and SPON which is a private environmental interest group. It is shown that a portion of the City of Newport Beach is within the 60 CNEL aircraft noise contour. A portion of the unincorporated of the County of Orange that is in the City's sphere of influence, Santa Ana Heights, is within the 65 CNEL contour. These contours represent the maximum noise acceptable to the City of Newport Beach and form the basis for land use and land planning decisions. The City will not rezone or redesignate any residential land use to make it consistent with any increase in noise resulting from the expiration of, termination of or modification to the JWA Settlement Agreement.

Noise contours represent lines of equal noise exposure, just as the contour lines on a topographic map are lines of equal elevation. The contours shown on the maps are the 60 and 65 dB CNEL noise levels. The noise contours presented should be used as a guide for land use planning. The 60 dB CNEL contour defines the Noise Referral Zone. This is the noise level for which noise considerations should be included when making land use policy decisions. The 65 dB CNEL contour describes the area for which new noise sensitive developments will be permitted only if appropriate mitigation measures are included such that the standards contained in this Element are achieved. Currently, no property designated for residential development is within the 65 CNEL contour area and no new residential development should be permitted. The reason for this restriction inside aircraft-generated 65 CNEL contours is that there is no practical way to mitigate

against aircraft noise in an exterior living area, while it is possible and practical to mitigate against ground-based traffic noise.

4.0 POLICIES AND IMPLEMENTATION

In order to develop policies and implementation measures, there must first be some quantitative noise level goals be met. These goals are established here in 2 forms. The first is a land use/noise compatibility matrix and the second are performance standards for design of facilities. A third set of quantitative noise level goals for controlling noise of stationary sources is presented later in the policies section.

The land use/noise compatibility matrix is presented in Table 1. This matrix is used at the zoning level of project review to evaluate land use suitability relative to the noise environment. The indoor and outdoor noise standards for various land uses are presented in Table 2. These noise standards are design performance requirements that are not to be exceeded. Any land use that is unable to meet the appropriate design noise standard would be deemed inconsistent with this Noise Element of the General Plan of the City of Newport Beach. These standards are evaluated during project review at the design level of review including site design review and building permit review. It should be noted that only the interior noise standard of 45 CNEL for residential uses is required by the State of California and it applies only to multi-family projects (California Noise Insulation Standards, California Administrative Code, Title 24, Part 2). The design noise standards specified in Table 2 provide the quantified standards for the goals in this Noise Element and extend the interior 45 CNEL requirement to single family dwellings.

The policies and their associated programs that follow are intended to guide the development of implementation actions in order to achieve the goals of the Noise Element. In order to achieve the goals and objectives of the Noise Element, an effective implementation program is necessary. The underlying purpose is to reduce the number of people exposed to excessive noise and to minimize the future effect of noise in the City. Following the policies are measures that the City should consider implementing to control the impacts of noise in Newport Beach.

Table 1

LAND USE NOISE COMPATIBILITY MATRIX

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL CNEL						
CATEGORIES	USES	<55	60	65	70	75	80	>
RESIDENTIAL	Single Family, Two Family, Multiple Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank Restaurant, Movie Theatre	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheatre, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
COMMERCIAL General, Special INDUSTRIAL,INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library Schools' Classroom	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

INTERPRETATION

ZONE A
CLEARLY COMPATIBLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

ZONE B
NORMALLY COMPATIBLE

New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

ZONE C
NORMALLY INCOMPATIBLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

ZONE D
CLEARLY INCOMPATIBLE

New construction or development should generally not be undertaken.

SOURCE: Mestre Greve Associates

Table 2

INTERIOR AND EXTERIOR NOISE STANDARDS

LAND USE CATEGORIES		ENERGY AVERAGE CNEL	
<u>CATEGORIES</u>	<u>USES</u>	INTERIOR ¹	EXTERIOR ²
RESIDENTIAL	Single Family, Two Family, Multiple Family	45 ³ 55 ⁴	65
	Mobile Home	----	65 ⁵
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Hotel, Motel, Transient Lodging	45	65 ⁶
	Commercial Retail, Bank Restaurant	55	----
	Office Building, Research and Development, Professional Offices, City Office Building	50	----
	Amphitheatre, Concert Hall Auditorium, Meeting Hall	45	----
	Gymnasium (Multipurpose)	50	----
	Sports Club	55	----
	Manufacturing, Warehousing, Wholesale, Utilities	65	----
	Movie Theatres	45	----
INSTITUTIONAL	Hospital, Schools' classroom	45	65
	Church, Library	45	----
OPEN SPACE	Parks	----	65

INTERPRETATION

- Indoor environment excluding: Bathrooms, toilets, closets, corridors.
- Outdoor environment limited to: Private yard of single family
Multi-family private patio or balcony which is served by a means of exit from inside.
Mobile home Park
Hospital patio
Park's picnic area
School's playground
Hotel and motel recreation area
- Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
- Noise level requirement with open windows, if they are used to meet natural ventilation requirement.
- Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
- Except those areas around the airport within the 65 CNEL contour.

SOURCE: Mestre Greve Associates

GOAL 4.1 - Provide programs that will reduce the noise levels in existing noise sensitive areas where the noise environment has already reached unacceptable levels and ensuring that new development in these areas is compatible with surrounding noise levels.

RELATED POLICY 4.1 - Provide for reduction in noise impacts from transportation related noise sources. Implementation options that the City may consider include:

- 4.1.1** The City shall require the employment of noise mitigation measures, consistent with funding capability, for private outdoor yard areas in the design of City arterial road improvement projects which result in noise level increases of 3 dB CNEL or greater, or at the time when cumulative City road projects result in a 3 dB CNEL or greater increase .
- 4.1.2** The City shall require the use of walls, berms or other noise mitigation measures in the design of new residential or other new noise sensitive land uses that are adjacent to major roads. Application of the Noise Standards in Table 2 shall govern this requirement.
- 4.1.3** The City shall seek to reduce transportation noise through proper design and coordination of transportation routing. As part of the evaluation of commercial projects, truck movements and routes in the City shall be evaluated to provide effective separation from residential or other noise sensitive land uses. For example, adding truck traffic to an arterial with adjacent commercial development along the roadway creates less of a relative noise impact than adding the truck traffic to a smaller roadway, such as a collector or secondary arterial, where the land use is predominantly residential.

- 4.1.4** The City shall encourage the enforcement of State Motor Vehicle noise standards for cars, trucks, and motorcycles through coordination with the California Highway Patrol and Newport Beach Police Department.
- 4.1.5** The City shall require that noise be considered as part of the City approval process for charter boating operations (Marine Charter Permit, Section 518 Municipal Code, Commercial Harbor Activities Permit, Section 1741 Municipal Code). Specifically, Conditions of Approval will require operators to not exceed the noise limits contained in the Noise Ordinance at residential land uses along the bay. Exceptions would be granted for purposes of safety (audible warning devices), maintenance (per the limits in hours of such activity contained in the Noise Ordinance), sporting events, and sports training activities.
- 4.1.6** The City shall ensure that the Zoning Ordinance, Circulation Element and Land Use Element of the General Plan fully integrate the policies adopted as part of this Noise Element. The Zoning Ordinance and Land Use Element shall reflect the requirements for consideration of noise in land use planning and zoning actions and the Circulation Element shall reflect this element's recommendations for noise mitigation as part of circulation improvement projects.
- 4.1.6.1** The City shall establish a program to secure funding for the construction of noise barriers to protect private outdoor yard areas along arterial roadways where existing homes are exposed to noise levels above the City noise standards and develop a priority program for the construction of such barriers. A potential source of such funding may be a fee for new projects which generate new traffic within the City as well

as road improvement funds where road improvements are made. The amount of these fees should be proportional to the amount of the new traffic that is caused by the new project. It should be recognized that noise barriers will not always be feasible mitigation to roadway noise. Noise barriers are most feasible for single family homes where the rear yards are adjacent to the roadway. The feasibility of other situations should be evaluated on a case by case basis.

GOAL 4.2 - Provide sufficient information concerning the community noise environment by presenting current and forecast noise levels so that noise can be objectively considered in land use planning decisions in the City of Newport Beach. This inventory of the noise environment within the City will identify the different types of noise sources, noise sensitive receptors, and some unique noise issues that face the City of Newport Beach.

RELATED POLICY 4.2 - Incorporate noise considerations into land use planning decisions. This policy is intended to prevent future noise and land-use incompatibilities. This policy will be achieved through adopting one or more of the following optional programs:

- 4.2.1** The City shall establish standards that specify acceptable limits of noise for various land uses throughout the City including schools, hospitals, convalescent homes, and other noise sensitive areas. These criteria are designed to fully integrate noise considerations into land use planning to prevent new noise/land use conflicts. Table 1 showed criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the bases for the development of specific Noise Standards. These standards, presented in Table 2, define the City policies related to land uses and acceptable noise levels. These tables are the

primary tools which allow the City to ensure noise integrated planning for compatibility between land uses and outdoor noise. The City shall require that all new projects within the City demonstrate compliance with these standards at the time of building permit application.

4.2.1.1 Mixed use projects shall be given special consideration during design review and Building Permit review. Every effort shall be made to ensure that the noise sensitive portions of mixed use projects meet all City noise requirements. The Planning Commission shall have the right to relax the exterior noise standards for residential uses provided that such areas are limited in size, that the project is oriented for adults, and that the interior 45 CNEL is met.

4.2.1.2 The City shall establish a threshold at which a remodel must comply with the Noise Standards shown in Table 2. In all cases all new room additions must meet the interior noise requirement. If the remodel involves addition of more than 50% new floor area, then all rooms in the structure must meet the interior noise standards shown in Table 2.

4.2.1.3 In-fill projects in existing residential areas adjacent to major arterials shall be given special consideration. Certain areas of the City such as Balboa Boulevard have residences very close to the road and construction (new or remodel) may have difficulty meeting the exterior noise standards for residential uses. The Planning Commission may relax the exterior noise requirements if it can be shown that there are no feasible mechanisms to meet the exterior noise levels. The interior standard of 45 CNEL shall not be relaxed for any residential project.

4.2.2 The City shall require acoustical design in new construction. The City shall continue to enforce the State of California Uniform Building Code provisions that specifies that the indoor noise levels for residential living spaces not exceed 45 dB CNEL due to the combined effect of all noise sources. The State requires implementation of this standard when the outdoor noise levels exceed 60 dB CNEL. The Noise Referral Zones (60 dB CNEL) can be used to determine when this standard needs to be addressed. The Uniform Building Code (specifically, the California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Sections T25-28) requires that *"Interior community noise levels (CNEL/LDN) with windows closed, attributable to exterior sources shall not exceed an annual CNEL or LDN of 45 dB in any habitable room."* The code requires that this standard be applied to all new hotels, motels, apartment houses and dwellings other than detached single-family dwellings. The City shall also apply this standard to single family dwellings.

4.2.2.1 The City shall provide access to a large scale map of roadway and CNEL contours anticipated for future conditions. Projects outside the relevant contours shall need no further demonstration of compliance with these standards. Prior to issuance of Building Permits noise sensitive uses within the 60 CNEL contour shall demonstrate through technical studies that the project will meet interior noise standards and exterior noise standards, if any. Such studies shall be conducted by persons qualified to perform such studies as demonstrated by Membership in the Institute of Noise Control Engineers (INCE) or be Registered Professional Engineer in the State of California.

4.2.2.2 The City shall require that, prior to issuance of building permits for multi-family structures, the applicant demonstrate that the design of the structure will adequately isolate noise between adjacent units (party walls and common floor/ceilings) per Chapter 35 of the Uniform Building Code.

4.2.3 The City shall consider establishing standards for certain noise not already governed by local ordinances or preempted by state or federal law as the need requires.

GOAL 4.3 - Provide policies and implementation measures that will protect and maintain those areas of the city that have acceptable noise environments. This includes protecting those areas affected by both transportation related noise as well as stationary noise sources.

RELATED POLICY 4.3 - Provide for reduction in noise impacts from non-transportation noise impacts. The focus of control of noise from non-transportation sources is the Noise Ordinance. The Noise Ordinance is used to protect people from noise generated by people or machinery on adjacent properties.

Note that enforcement of party noise impacts and barking dog impacts are presented as optional components of the Noise Ordinance. If not included in the ordinance they would remain a function of police department enforcement action per existing City policy. This is done because the noise ordinance enforcement is through specific site measurements. Neither party noise nor barking dogs, by virtue of their intermittent and unpredictable 'schedule,' are easily measured for enforcement purposes and the presence of enforcement personnel can influence the resulting measurements, i.e., party goes quiet down when city officials arrive or dogs bark at the measurement personnel.

4.3.1 The City shall adopt a new comprehensive noise ordinance to ensure that City residents are not exposed to excessive noise levels from stationary noise sources. The purpose of the ordinance is to protect people from non-transportation related noise sources such as music, machinery, pumps and air conditioners. The noise ordinance does not apply to motor vehicle noise on public streets or to any aircraft. The noise ordinance is designed to protect quiet residential areas (or other land uses requiring quiet, such as hospitals or convalescent homes, etc.) from stationary noise sources. Land uses are determined by their actual use and not by the current zoning designation. All new noise sources would be required to meet the noise ordinance at the time of construction. Existing noise sources would be given a 2 year period to be brought into compliance. The Noise Ordinance compliance and enforcement shall be designed for easy application by City staff.

4.3.1.1 The control of noise from parties at residential sites and noise from barking dogs shall not be included in the noise ordinance, but shall remain a function of the Police Department as provided by existing City Code.

4.3.2 All new building permits shall be issued based on compliance with the noise limits in the Noise Ordinance. A specific set of conditions shall be developed for the issuance of building permits that include mechanical equipment. Maximum noise levels shall be defined. Definitions of noise sensitive areas of residential properties shall be defined and compliance demonstrated prior to the issuance of a building permit.

4.3.2.1 Air-conditioners present special problems in areas of the City where side yard setbacks are very small (Balboa Island, Lido Island, and Balboa Peninsula). Air-conditioners are exempt

from enforcement action under the Noise Ordinance. New permits for air-conditioners would be issued only where such installations can be shown by computation, based on the Sound Rating of the proposed equipment, to not exceed an A-weighted Sound Pressure Level of 55 dBA. The method of computation used shall be that specified in "Standard Application of Sound Rated Outdoor Unitary Equipment," Standard 275, Air-conditioning and Refrigeration Institute, 1984 or latest revision thereof.

4.3.2.2 In the event that air-conditioning equipment cannot meet the requirements set forth above, then the noise limit for such equipment may be raised to 65 dBA provided that the applicant obtains the written consent of all owners of affected property.

4.3.3 All new use permits shall be issued based on compliance with the noise limits in the Noise Ordinance. A specific set of conditions shall be developed for the issuance use permits that include any use that may cause noise impacts on residential areas. This includes, but is not limited to, restaurants, bars, entertainment, parking facilities, and other commercial uses where large numbers of people may be present. Maximum noise levels shall be defined. Definitions of noise sensitive areas of residential properties shall be defined and compliance demonstrated prior to the issuance of the use permit. Restaurants, bars, and other entertainment type uses may be subject to a special provision of the regulation that requires that operators of a facility with a noise violation history be required to conduct on site noise monitoring to verify compliance with the noise limits.

4.3.4 City enforcement of the community Noise Ordinance shall be the responsibility of the Code Enforcement staff of the Planning Department. The most effective method to control community noise impacts from non-transportation noise sources is through application of the community noise ordinance. It shall be the policy of the City to notify applicants for building permits that include mechanical equipment of the existence of the Noise Ordinance. Examples would include applicants for pools, spas, or air conditioners in which mechanical equipment is located near residential property lines as well as certain industrial activities and loading operations. The City may require as a condition of project approval, at its discretion, noise measurement data be provided to the City after construction demonstrating compliance with the Noise Ordinance.

4.3.4.1 The computational demonstration of compliance with noise limits shall be reviewed and approved by the Building Department prior to issuance of building permits for air conditioning equipment.

RELATED POLICY - Resolving existing and potential conflicts between various noise sources and other human activities.

4.3.5 The City shall enforce the limits on hours of construction activity in or adjacent to residential areas in order to reduce the intrusion of noise in the early morning and late evening hours and on weekends and holidays (see Noise Ordinance for specific hours). At the time of project approval (use permit) the City shall ensure, through conditions of approval, that adequate noise control measures at all construction sites are provided (through the provision of mufflers and the physical separation of machinery maintenance areas from adjacent residential uses).

4.3.6 The City shall establish and maintain coordination among the City agencies involved in noise abatement. Ensure the continued operation of noise enforcement efforts of the City through the Code Enforcement Officer and the Police Department.

4.3.7 As a condition of use permit approval, the City shall limit delivery hours for stores with loading areas or docks fronting, siding, bordering, or gaining access on driveways adjacent to noise sensitive areas. Exemption from this restriction should be based solely on full compliance with the nighttime noise limits in the Noise Ordinance. Grocery stores are the major concern for late night delivery noise. The City shall consider limiting delivery hours as part of the use permit for such projects when noise sensitive uses are within 100 feet of loading areas unless it can be shown that such noise is in full compliance with the Noise Ordinance. The City shall consider potential effects of such limits relative to increasing peak hour truck movements. In particular, the City shall consider in determining limits on delivery hours if such limits on delivery hours will result in increased peak hour truck movements and corresponding potential increases in air quality impacts.

4.3.8 The City shall enforce the Noise Ordinance noise limits and limits on hours of maintenance or construction activity in or adjacent to residential areas that result from in-home hobby or work related activities.

GOAL 4.4 - To establish a comprehensive program and minimize the impact of noise generated by aircraft departing JWA and the quality of life for Newport Beach residents by preserving the operational restrictions at JWA, investigating ways to extend or strengthen those restrictions, and encouraging the development of a second commercial airport in Orange County.

RELATED POLICY 4.4.1 - Preservation of the JWA Settlement Agreement. The City Council and staff shall take all steps necessary to protect the validity of the JWA Settlement Agreement. These steps include, without limitation, the following:

1. The City shall oppose, or seek protection from, any Federal legislative or regulatory action that would or could affect or impair the County's ability to operate JWA consistent with the provisions of the JWA Settlement Agreement or the City's ability to enforce the Settlement Agreement. City staff shall continue to monitor possible amendment of the Airport Noise and Capacity Act of 1990 as well as various FAA Regulations and Advisory Circulars that relate to aircraft departure procedures.
2. The City shall maintain membership in NOISE and/or other groups whose primary purpose is to preserve the right of airport proprietors or noise impacted residents to establish or enforce reasonable restrictions to reduce the noise impact of commercial aircraft operations.
3. The City shall request, and assist the County in implementing, improvements to the comprehensive noise control program at JWA, which are consistent with the terms and provisions of the Settlement Agreement, and do not adversely impact airport capacity or safety. Such improvements could include, without limitation, the following:
 - (a) Implementation of aircraft flight or departure procedures which assure the community of the best feasible noise abatement;
 - (b) The preservation of the existing permanent remote monitoring stations and the upgrade of the current noise monitoring system whenever feasible;

- (c) Continued enforcement of the General Aviation Noise Ordinance.

4.4.2 Possible Extension of the Settlement Agreement.

City staff is directed to continue to discuss and, subject to City Council approval, negotiate amendments to the JWA Settlement Agreement. The City Council will not approve any amendments to the Settlement Agreement absent FAA approval, preservation of the curfew, and a permanent reduction in the number of permitted departures by the noisiest commercial aircraft currently using the airport. These are the minimum criteria that must be satisfied before the Council will even consider any limited increase in the number of permitted commercial jet departures or passenger service levels.

- 4.4.3** The airport noise and transportation source noise assumptions in this Element are based upon provisions of the John Wayne Airport Settlement Agreement, the Phase 2 Access Plan and Quarterly Noise Report Update prepared by JWA administration. The current 65 CNEL contours and the 85 SENEL contours, which are based upon the fleet mix and average number of ADD for the first quarter of 1994, are the basis for the existing densities and intensities of development authorized in the Land Use Element. An increase of 5%, or more in the area within the 65 CNEL or the 85 SENEL would be inconsistent with this Element and the Land Use Element.

- 4.4.4** Modifications to the Phase 2 Access Plan and/or John Wayne Airport Settlement Agreement that would reduce airport capacity or affect aircraft safety shall not be permitted. The City shall not agree to any modification to the John Wayne Airport Settlement Agreement or Phase 2 Access Plan unless the Federal Aviation Administration has issued written commitments that the amendments do not affect or impair the

grandfathered status of the Access Plan or Settlement Agreement pursuant to provision of the Airport Noise and Capacity Act of 1990.

5.0 ANALYSIS

5.1 Noise Definitions

Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the way that the Richter scale is used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud; and 20 dBA higher four times as loud; and so forth. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud). Examples of various sound levels in different environments are shown in Figure 7.

Sound levels decrease as a function of distance from the source as a result of wave divergence, atmospheric absorption, and ground attenuation. As the sound wave travels away from the source, the sound energy is spread over a greater area, dispersing the sound power of the wave. Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence and the resultant fluctuations. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. Turbulence and gradients of wind, temperature and humidity also play a significant role in determining the degree of attenuation.

Noise has been defined as unwanted sound and it is known to have several adverse effects on people. From these known effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. This criteria is based on such known effects of noise on people as hearing loss (not generally a factor with community noise), communication interference, sleep

SOUND LEVELS AND LOUDNESS OF ILLUSTRATIVE NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS
(A-Scale Weighted Sound Levels)

dB(A)	OVER-ALL LEVEL Sound Pressure Level Approx. 0.0002 Microbar	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
130	UNCOMFORTABLY	Military Jet Aircraft Take-Off With After-burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
120 110	LOUD	Turbo-Fan Aircraft @ Take Off Power @ 200 Ft. (90)	Riveling Machine (110) Rock-N-Roll Band (108-114)	110 dB(A) 16 Times as Loud
100	VERY	Jet Flyover @ 1000 Ft. (103) Boeing 707, DC-8 @ 6080 Ft. Before Landing (106) Bell J-2A Helicopter @ 100 Ft. (100)		100 dB(A) 8 Times as Loud
90	LOUD	Power Mower (96) Boeing 737, DC-9 @ 6080 Ft. Before Landing (97) Motorcycle @ 25 Ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 Ft. (89) Prop. Airplane Flyover @ 1000 Ft. (88) Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. From Pavement Edge, 10:00 AM (76 +or- 6)	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Electric Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60 dB(A) 1/2 as Loud
50	QUIET	Large Transformers @ 100 Ft. (50)		50 dB(A) 1/4 as Loud
40		Bird Calls (44) Lower Limit Urban Ambient Sound (40)		40 dB(A) 1/8 as Loud
	JUST AUDIBLE	(dB[A] Scale Interrupted)		
10	THRESHOLD OF HEARING			

SOURCE: Reproduced from Melville C. Branch and R. Dale Beland, Outdoor Noise in the Metropolitan Environment,
Published by the City of Los Angeles, 1970, p.2.

FIGURE 7

Examples of Sound Levels in Different Environments

interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narratives:

HEARING LOSS is, in general, not a concern in community noise problems. The potential for noise-induced hearing loss is more commonly associated with vocational noise exposures in heavy industry or very noisy work environments with long-term exposure. The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dBA for 8 hours per day to protect from hearing loss. Noise levels in neighborhoods, even in very noisy airport environments near major international airports, is not sufficiently loud to cause hearing loss.

COMMUNICATION INTERFERENCE is one of the primary concerns in environmental noise problems. Communication interference includes speech interference and activities such as watching television. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level. Figure 8 shows the percent of sentence intelligibility with respect to various noise levels.

SLEEP INTERFERENCE is a major noise concern in noise assessment and, of course, is most critical during nighttime hours. Sleep disturbance is one of the major causes of annoyance due to community noise. Noise can make it difficult to fall asleep, and can create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages and cause awakening. Noise may even cause awakening which a person may or may not be able to recall.

Extensive research has been conducted on the effect of noise on sleep disturbance. Recommended values for desired sound levels in residential bedroom space range from 25 to 45 dBA with 35 to 40 dBA being the norm. The National Association of Noise Control Officials have published data on the probability of sleep

disturbance with various single event noise levels. Based on experimental sleep data as related to noise exposure, a 75 dBA interior noise level event will cause noise induced awakening in 30 percent of the cases.

PHYSIOLOGICAL RESPONSES are those measurable effects of noise on people which are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is not known to which these physiological responses cause harm or are sign of harm. Generally, physiological responses are a reaction to a loud short term noise such as a rifle shot or a very loud jet overflight.

ANNOYANCE is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability. The level of annoyance, of course, depends on the characteristics of the noise (i.e.; loudness, frequency spectra, time, and duration), and how much activity interference (e.g. speech interference and sleep interference) results from the noise.

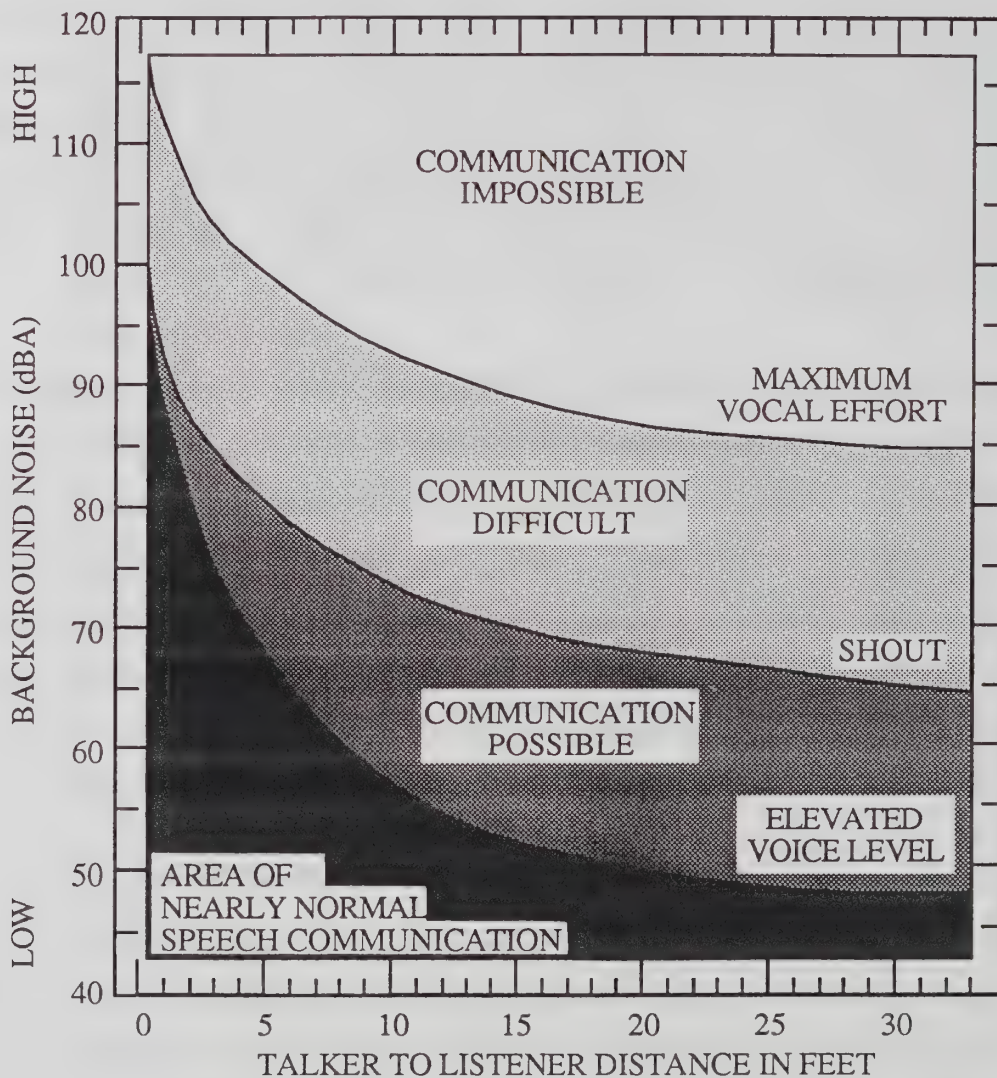


FIGURE 8

Noise Levels vs. Speech Intelligibility

However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2 to 10 percent of the population is highly susceptible to noise not of their own making, while approximately 20 percent are unaffected by noise. Attitudes are affected by the relationship between the person and the noise source (is it our dog barking or the neighbor's dog?). Whether we believe that someone is trying to abate the noise will also affect our level of annoyance.

5.2 Noise Metric and Assessment Criteria

Community noise is generally not steady state and varies with time. Under conditions of non-steady state noise, some type of statistical metric is used to quantify noise exposure over a long period of time. Several rating scales have been developed for describing the effects of noise on people. They are designed to account for the known effects of noise on people.

Based on these effects, the observation has been made that the potential for noise to impact people is dependent on the total acoustical energy content of the noise. A number of noise scales have been developed to account for this observation. These scales are: the Equivalent Noise Level (LEQ), the Day Night Noise Level (LDN), and the Community Noise Equivalent Level (CNEL). These scales are described in the following paragraphs.

LEQ is the "energy" average noise level during the time period of the sample. It is a number that represents a decibel sound level. This constant sound level would contain an equal amount of energy as a fluctuating sound level over a given period of time. LEQ can be measured for any time period, but is typically measured for 15 minutes, 1 hour or 24-hours.

LDN is a 24-hour, time-weighted annual average noise level. Time-weighted refers to the fact that noise which occurs during certain sensitive time periods is penalized for occurring at these times. In the LDN scale, those events that take place during the night (10 pm to 7 am) are penalized by 10 dB. This penalty was selected to attempt to account for increased human sensitivity to noise during the quieter period of a day, where sleep is the most probable activity.

CNEL is similar to the LDN scale except that it includes an additional 5 dBA penalty for events that occur during the evening (7 pm to 10 pm) time period. Either LDN or CNEL may be used to identify community noise impacts within the Noise Element. Example noise environments in terms of the CNEL metric are shown in Figure 9.

The public reaction to different noise levels varies from community to community. Extensive research has been conducted on human responses to exposure of different levels of noise. Figure 10 relates LDN noise levels to community response from some of these surveys. Community noise standards are derived from tradeoffs between community response surveys, such as this, and economic considerations for achieving these levels.

Intermittent or occasional noise such as those associated with stationary noise sources is not of sufficient volume to exceed community noise standards that are based on a time averaged scale such as the CNEL scale. To account for intermittent noise, another method to characterize noise is the Percent Noise Level (L%). The Percent Noise Level is the level exceeded X% of the time during the measurement period. Percent Noise Levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, L50 is the level exceeded 50 percent of the time, and L10 is the level exceeded 10 percent of the time. L90 represents the background or minimum noise level, L50 represents the average noise level, and L10 the peak or intrusive noise levels. Examples of various noise environments in terms of the Percent Noise Levels are shown in Figure 11.

Noise Ordinances have been historically specified in terms of the percent noise levels. Noise Ordinance limits expressed in terms of percent noise levels can be converted to Equivalent Noise Levels (Leq) that represent the same regulatory limit. Ordinances are designed to protect people from non-transportation related noise sources such as loud music, machinery and vehicular traffic on private property.

CNEL Outdoor Location

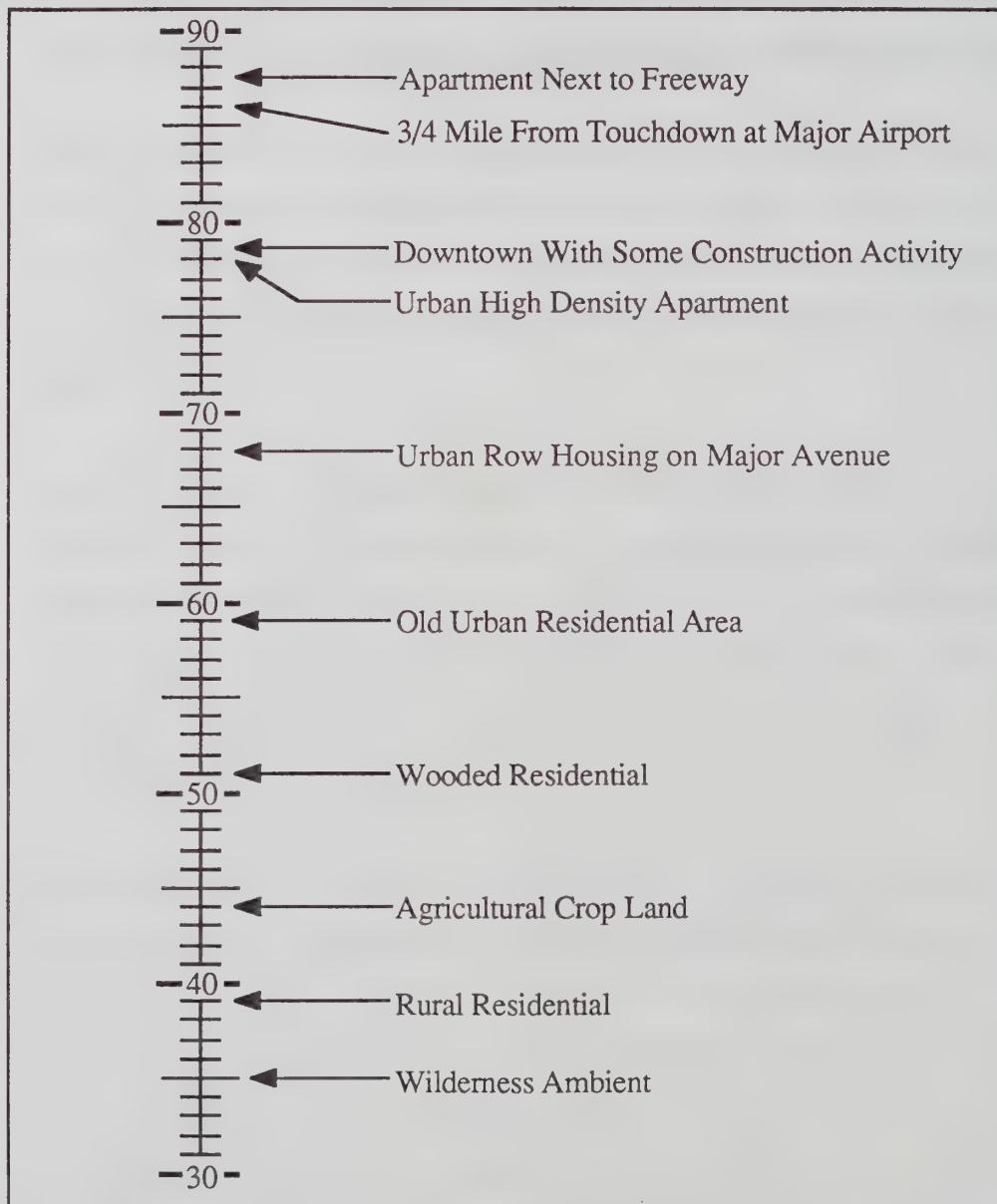


FIGURE 9

Typical Outdoor CNEL Noise Levels

COMMUNITY REACTION

VIGOROUS
COMMUNITY
ACTION

SEVERAL
THREATS OF
LEGAL ACTION,
OR STRONG
APPEALS TO
LOCAL
OFFICIALS TO
STOP NOISE

WIDESPREAD
COMPLAINTS OR
SINGLE THREAT
OF LEGAL ACTION

SPORADIC
COMPLAINTS

NO REACTION,
ALTHOUGH NOISE IS
GENERALLY
NOTICEABLE

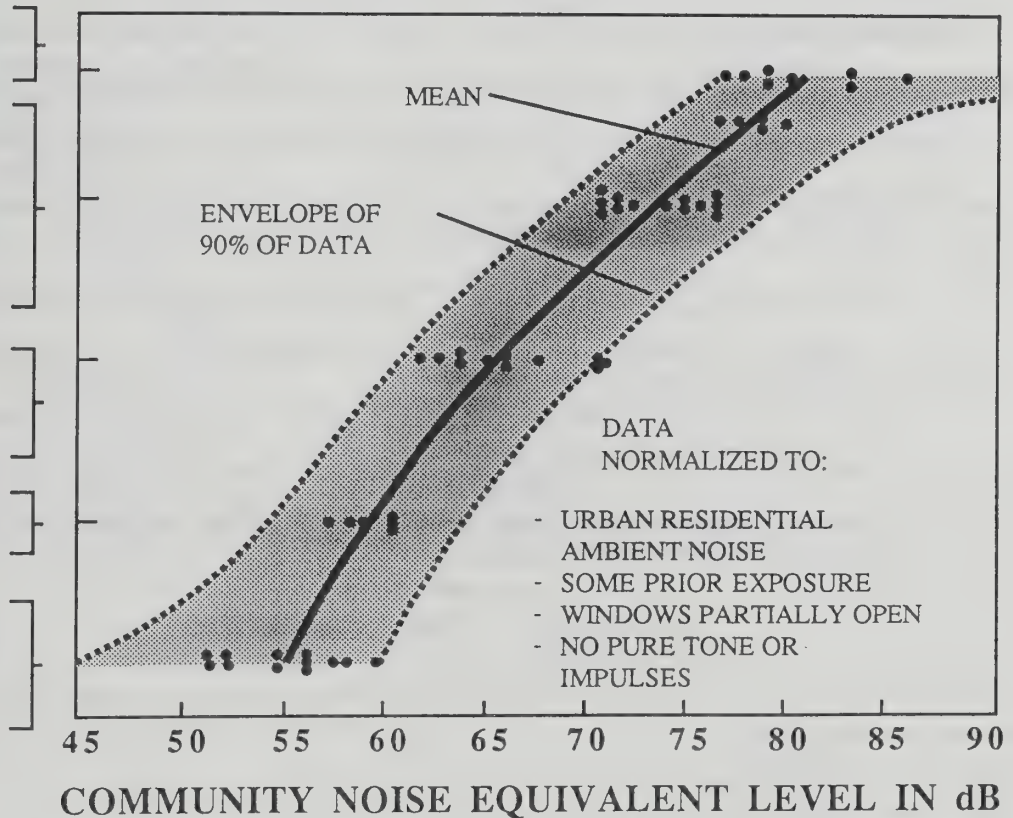


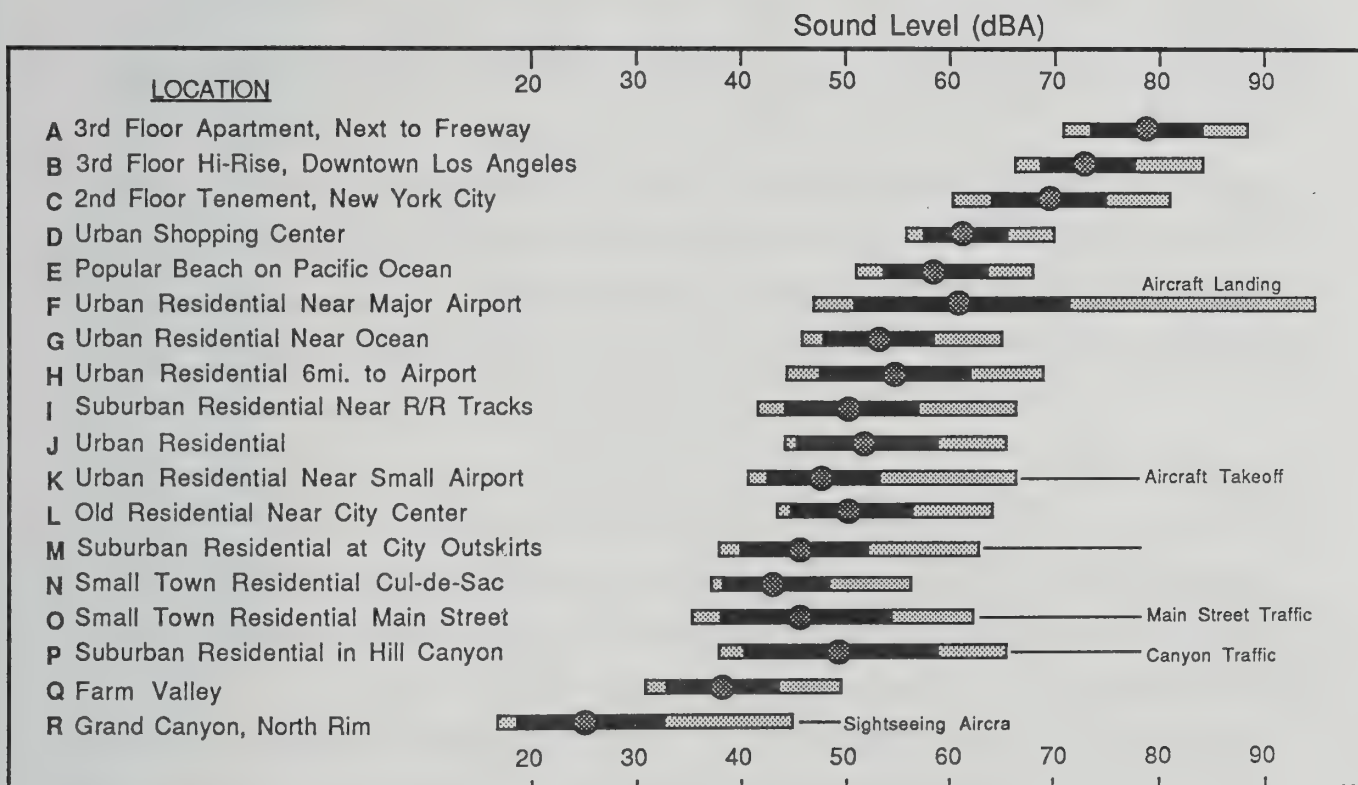
FIGURE 10

Community Responses to Ldn Noise Levels

5.3 Noise and Land Use Compatibility Guidelines

The purpose of this section is to present information regarding the compatibility of various land uses with environmental noise. It is from these guidelines and standards that the City of Newport Beach Noise Criteria and Standards are developed. Noise/land use guidelines have been produced by a number of Federal and State agencies including the Federal Highway Administration, the Environmental Protection Agency, the Department of Housing and Urban Development, the American National Standards Institute and the State of California. These guidelines, presented in the following paragraphs, are all based upon cumulative noise criteria such as LEQ, LDN or CNEL.

The *ENVIRONMENTAL PROTECTION AGENCY* published in March 1974 a very important document entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety" (EPA 550/9-74-004). Figure 12 presents a table of land uses and requisite noise levels. In this table, 55 LDN is described as the requisite level with an adequate margin of safety for areas with outdoor uses; this includes residences and



SOURCE: Community Noise, EPA, 1971

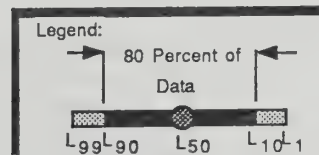


FIGURE 11

Noise Environments in Terms of Percent Noise Levels

	Measure	Indoor Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects (b)	Outdoor Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects (b)
Residential with Outside Space and Farm Residences	Ldn	45		45	55		55
	Leq(24)		70			70	
Residential with No Outside Space	Ldn	45		45			
	Leq(24)		70				
Commercial	Leq(24)	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	Leq(24)	(a)	70	(a)			
Industrial	Leq(24)(d)	(a)	70	70(c)	(a)	70	70(c)
Hospitals	Ldn	45		45	55		55
	Leq(24)		70			70	
Educational	Ldn	45		45	55		55
	Leq(24)		70			70	
Recreational Areas	Leq(24)	(a)	70	70(c)	(a)	70	70(c)
Farm Land and General Unpopulated Land	Leq(24)				(a)	70	70(c)

Code:

- a. Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity.
- b. Based on lowest level.
- c. Based only on hearing loss.
- d. An Leq(8) of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an Leq of 60 dB.

Note: Explanation of identified level for hearing loss: The exposure period which results in hearing loss at the identified level is a period of 40 years.

* Refers to energy rather than arithmetic averages.

SOURCE : EPA

FIGURE 12

EPA Land Uses and Requisite Noise Levels

recreational areas. The EPA "levels document" does not constitute a standard, specification or regulation, but identifies safe levels of environmental noise exposure without consideration for economic cost for achieving these levels.

The *FEDERAL HIGHWAY ADMINISTRATION (FHWA)* has adopted and published noise abatement criteria for highway construction projects. The noise abatement criteria specified by the FHWA are presented in Figure 13 in terms of the maximum one-hour Noise Equivalent Level (LEQ). The FHWA noise abatement criteria basically establishes an exterior noise goal for residential land uses of 67 LEQ and an interior goal for residences of 52 LEQ. The noise abatement criteria applies to private yard areas and assumes that typical wood frame homes with windows open provide 10 dB noise reduction (outdoor to indoor) and 20 dB noise reduction with windows closed.

The *STATE OF CALIFORNIA* requires each city and county to adopt Noise Elements in their General Plans. Such Noise Elements must contain a noise/land use compatibility matrix. A recommended (but not mandatory) matrix is presented in the "Guidelines for the Preparation and Content of Noise Elements of the General Plan," (Office of Noise Control, California Department of Health, February 1976). Figure 14 presents this recommended matrix.

5.4 Techniques For Mitigation of Community Noise

The sources of noise in Newport Beach can be divided into two basic categories, transportation sources and non-transportation sources. A local government has limited direct control of transportation noise at the source. State and Federal agencies have the responsibility to control the noise from the source, such as vehicle noise emission levels. The most effective method available to the City to mitigate transportation noise and reduce the impact of the noise onto the community is through comprehensive planning

that includes noise as a planning criteria, the inclusion of noise mitigation in project planning and design i.e., construction of noise barriers and improved building noise reduction characteristics.

Mitigation through the design and construction of a noise barrier (wall, berm, or combination wall/berm) is the most common way of alleviating traffic noise impacts. Figure 15 illustrates how a noise barrier effect occurs. The effect of a noise barrier is critically dependent on the geometry between the noise source and the receiver. A noise barrier effect occurs when the "line of sight" between the source and receiver is penetrated by the barrier. The greater the penetration, the greater the noise reduction.

ACTIVITY CATEGORY	DESIGN NOISE LEVEL - LEQ	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas and parks which are not included in category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	-	For requirements of undeveloped lands see FHWA PPM 773.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

FIGURE 13

FHWA Noise Abatement Criteria

Land Use Category	Community Noise Exposure Ldn or CNEL, dB					
	55	60	65	70	75	80
Residential - Low Density Single Family, Duplex, Mobile Homes	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Residential - Multiple Family	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Transient Lodging - Motels, Hotels	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Schools, Libraries, Churches Hospitals, Nursing Homes	Normally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Auditoriums, Concert Halls, Amphitheatres	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Sports Arena, Outdoor Spectator Sports	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Playgrounds, Neighborhood Parks	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Golf Courses, Riding Stables Water Recreation, Cemeteries	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
Office Buildings, Business Commercial and Residential	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Industrial, Manufacturing Utilities Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable

Interpretation

Normally Acceptable

Specified Land Use is Satisfactory, Based Upon the Assumption that Any Buildings Involved are of Normal Conventional Construction, Without Any Special Noise Insulation Requirements.

Conditionally Acceptable

New Construction or Development Should be Undertaken Only After a Detailed Analysis of the Noise Reduction Requirement is Made and Needed Noise Insulation Features Included in the Design. Conventional Construction, but with Closed Windows and Fresh Air Supply Systems or Air Conditioning, Will Normally Suffice.

Normally Unacceptable

New Construction or Development Should Generally be Discouraged. If New Construction or Development Does Proceed, a Detailed Analysis of the Noise Reduction Requirements Must be Made and Needed Noise Insulation Features Included in the Design.

Clearly Unacceptable

New Construction or Development Should Generally not be Undertaken.

FIGURE 14

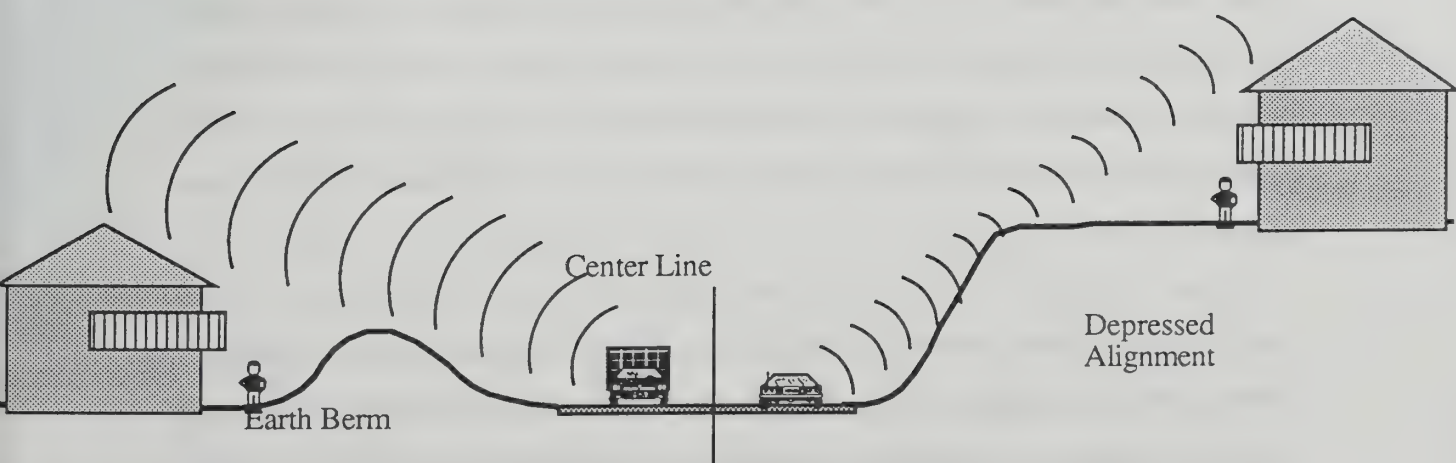
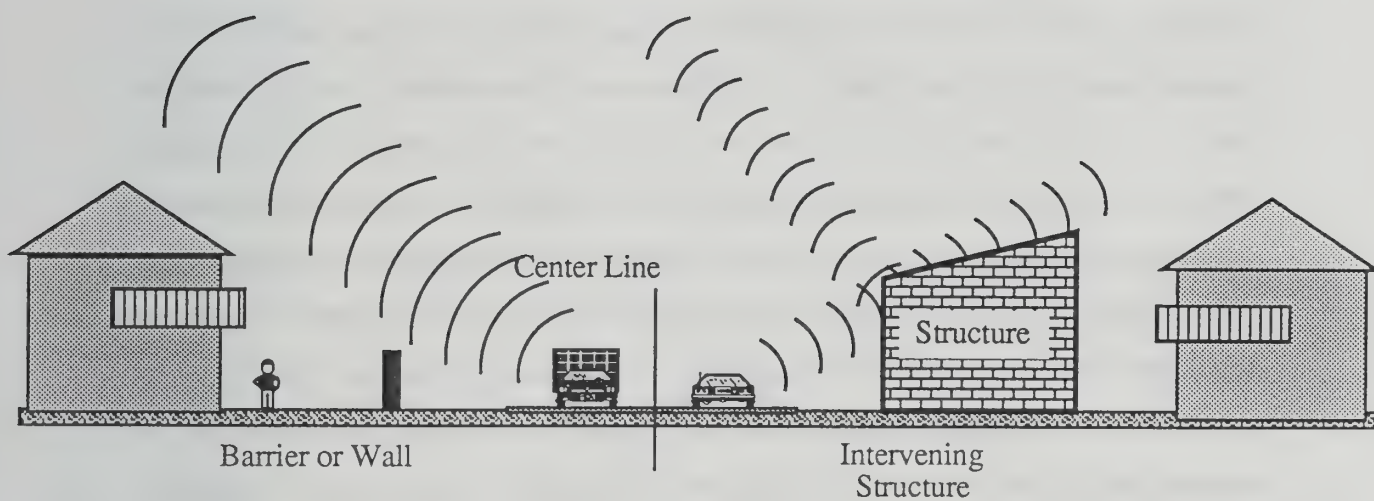


FIGURE 15

Noise Barrier Effect Illustration

Building interior noise levels can also be reduced through design of the structure. Windows and doors are the most important paths for sound to enter a structure. Use of sound insulating doors and windows can provide substantial reductions of interior noise levels.

Noise concerns should be incorporated into land use planning to reduce future noise and land use incompatibilities. This is achieved by establishing standards and criteria that specify acceptable limits of noise for various land uses throughout the City. These criteria are designed to integrate noise considerations into land use planning to prevent noise/land use conflicts. Table 1 presents criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the basis for the development of specific Noise Standards. These standards, shown in Table 2, present the City policies related to land uses and acceptable noise levels. These tables are the primary tools which allow the City to ensure integrated planning for compatibility between land uses and outdoor noise and are described further below.

The Land Use Compatibility Matrix presented in Table 1 presents broad ranges of compatibility and are intended to be flexible enough to apply to a wide range of projects and environments. For example, a project in a large undeveloped area may be evaluated in the compatibility matrix differently than an infill project in a densely developed area of the City. But in no case would it be desirable for any land use to have noise exceeding the highest 'normally compatible' noise level shown in the matrix. This matrix is intended to be used as one of the many planning factors that used in the land use planning process.

The Noise Standards presented in Table 2 are intended to be much more specific in terms of project requirements. These standards are intended to be design performance requirements that are not exceeded. And while the compatibility matrix covers broad ranges of compatibility, the design standards are specific and inability to meet the design standards would be inconsistent with this Element of the General Plan. It should be

noted that only the interior noise standard of 45 CNEL for residential uses is required by the State of California and it applies only to multi-family projects (California Noise Insulation Standards, California Administrative Code, Title 24, Part 2).

The most limiting factor of the Noise Standards are in the exterior noise requirements for residential projects. If airport noise levels exceed 65 CNEL there are no feasible project design methods to mitigate outdoor aircraft noise exposures, thus precluding residential

development in these areas. This is only a concern in the area of Santa Ana Heights which is not in the City but is in its sphere of influence. Another area that the City residential exterior noise standard is limiting is for certain residential areas, such the peninsula area, where lots and homes are adjacent to a major arterial with very small setbacks. In such situations providing noise barriers may present a number of design problems or conflicts with other planning or zoning requirements. There are no general solutions to these specific kinds of conflicts but must be considered on a site by site basis.

Mixed use projects present other challenges for noise control. Such projects may become more prevalent along Pacific Coast Highway between Newport Boulevard and Dover. Mixed use projects can include many types of projects but are a concern for noise when residential uses are included with a variety of commercial uses. In such cases the density of the project ensures that noise levels will be higher than more typical low density suburban residential uses. The typical design problem with mixed use projects lies in appropriately isolating the residential uses from the commercial uses which includes anticipating the level of noise from the commercial uses. For example, a residential use in the vicinity of a restaurant use may or may not present a noise problem depending on the type of restaurant, i.e., a night club, quiet formal dining, or fast food establishment. It is intended that residential uses as part of mixed use projects meet the Noise Standards and Noise Ordinance limits even though they may not be compatible as defined in the land use compatibility matrix. Other issues that occur with mixed use

projects are trash pickup. While trash pickup in residential areas cannot occur before 7 am, such restriction do not apply to commercial areas. Design of residential portions of mixed use projects must account for this. Again project specific consideration is required.

The most effective method to control community noise impacts from non-transportation noise sources is through application of Noise Ordinances or Regulations. These are designed to protect quiet residential areas from stationary noise sources. The noise levels encouraged by noise ordinances assure that noise from mechanical equipment, and other types of non-transportation noise are not excessive in residential areas.

6.0 GLOSSARY

A-WEIGHTED SOUND LEVEL - The sound pressure level in decibels as measured on a sound level meter using the A-Weighted filter network. The A-Weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

AMBIENT NOISE LEVEL - The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL) - The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DAY-NIGHT AVERAGE LEVEL (LDN) - The average equivalent A-Weighted sound level during a 24-hour day, obtained after addition of ten (10) decibels to sound levels in the night before 7 a.m. and after 10 p.m.

DECIBEL (dB) - A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

dBA - A-weighted sound level (see definition above)

EQUIVALENT SOUND LEVEL (LEQ) - The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

FREQUENCY - The number of times per second that a sound pressure signal oscillates about the prevailing atmosphere pressure. The unit of frequency is the hertz. The abbreviation is Hz.

INTRUSIVE NOISE - That noise which intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

L10 - The A-Weighted sound level exceeded 10 percent of the sample time. Similarly L50, L90, L99, etc.

NOISE - Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

NOISE ATTENUATION - The ability of a material, substance, or medium to reduce the noise level from one place to another or between one room and another. Noise attenuation is specified in decibels.

NOISE EXPOSURE CONTOURS - Lines drawn around a noise source indicating constant or equal level of noise exposure. CNEL and Ldn are typical metrics used.

NOISE REFERRAL ZONES - Such zones are defined as the area within the contour defining a CNEL level of 60 decibels. It is the level at which either State or Federal laws and standards related to land use become important and , in some cases, preempt local laws and regulations. Any proposed noise sensitive development which may be impacted by a total noise environment of 60 dB CNEL or more should be evaluated on a project specific basis.

NOISE SENSITIVE LAND USE - Those specific land uses which have associated indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise produced by community sound sources. Such human activity typically occurs daily for continuous periods of 24 hours or is of such a nature that noise is significantly disruptive to activities that occur for short periods. Specifically, noise sensitive land uses include: residences of all types, hospitals, rest homes, convalescent hospitals places of worship and schools.

SOUND LEVEL (NOISE LEVEL) - The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

SOUND LEVEL METER - An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Appendices:

Technical Component of the Noise Element (Under separate Cover)

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